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Epidemiologic Notes and Reports

Drownings in a Private Lake — North Carolina, 1981–1990

Drowning is the third most common cause of death from unintentional injury in the United States (*1*); in 1989, in North Carolina, drownings were the leading cause of years of potential life lost before age 65 per death (*2*). From July 1 through August 31, 1990, two drownings occurred in a private lake in Beaufort County (1990 population: 42,283), North Carolina. A review of data from the Office of the Chief Medical Examiner (OCME) in North Carolina identified two additional drownings at this lake during 1981–1990, and a total of 17 drownings in the county during the 10-year period. At the request of the local health director, in October 1990, the North Carolina Department of Environment, Health, and Natural Resources (DEHNR) investigated the drownings using information from OCME files, hospital medical records, and ambulance reports. This report summarizes the investigation of the four drownings in the private lake, recommendations to prevent additional drownings, and characteristics of drownings in North Carolina in 1989.

This lake is on a private campground but is accessible to the general public. It is approximately 250 feet wide and 400 feet long with an average depth of approximately 9 feet, has a sandy bottom, and fills naturally by seepage of groundwater. To control algae, the owners had added a blue dye that made the water impermeable to light and reduced underwater visibility.

The decedents ranged in age from 7 to 15 years; all were male. Postmortem blood alcohol testing was obtained for three decedents; all tests were negative. Two decedents were reported by family members to be poor swimmers, and two were known to have been swimming without supervision. All the drownings occurred during June, July, or August; three were on a weekend or holiday, and all occurred between 1:30 p.m. and 4:30 p.m. Lifeguards were not present during any of the drownings, and a posted sign read "swim at your own risk."

All the drownings occurred in a heavily used part of the lake. Two persons had jumped off a diving board near the shoreline and reportedly never resurfaced. Another drowned approximately 8 feet from shore near the transition from shallow

Drownings – Continued

(approximately 4.5 feet) to deep (approximately 7 feet) water. The fourth drowned near a platform approximately 25–30 feet offshore. Two persons were under water ≤10 minutes and received cardiopulmonary resuscitation (CPR) at the scene. The other two were under water approximately 6 hours each. Three died at the scene, and the fourth survived 11 hours. None of these persons had external signs of trauma, and all drownings were determined to be unintentional.

Based on the investigation, during December 1990, state and local public health officials recommended that the owners of the lake implement the following measures: 1) maintain a lifeguard on duty during regularly scheduled hours of operation, 2) establish a safe-bather capacity based on a recommended amount of water surface per person, 3) display clearly labeled lifesaving equipment, 4) install float-lines marking water depths, 5) post signs displaying safety information, 6) use algae-control methods that do not reduce water clarity, and 7) consult a design engineer regarding the placement of recreational equipment at the site.

Owners of the lake had not acted on any of these recommendations by May 1991 when a fifth person (a 15-year-old boy) drowned at the lake. The county health director subsequently declared the lake to be an imminent hazard and instructed the owners to comply with several of the safety recommendations. As a consequence, by June 1991, the owners hired full-time lifeguards, restricted swimming in certain parts of the lake, posted depth markings, provided safety guidance for swimmers, and discontinued the use of coloring agents to control algae. No drownings have occurred at the lake since the owners implemented these safety recommendations. State and local health officials have continued to work with the owners of the lake to reduce drowning hazards and to evaluate the effectiveness of drowning-prevention actions.

To characterize drownings that occurred in natural swimming areas in North Carolina, the DEHNR reviewed data from the OCME, local health departments, and local police agencies for 1989 (the most recent year for which complete data were available). During 1989, 57 (38%) of the 151 drownings occurred in lakes or ponds. Of these 57 drownings, 32 (56%) occurred while the persons were swimming; in 10 of these incidents, the swimming area had been openly advertised as accessible for public swimming. However, six of these 10 incidents occurred in locations where lifeguards usually were not present.

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Editorial Note: In the United States, drowning rates are highest for males, children <5 years of age, and young adults 15–24 years of age (*3–5*). Factors commonly associated with drowning while swimming include lack of supervision (*6*); alcohol consumption (*7*); poor swimming ability (*7*); and absence of persons trained in lifesaving techniques, including CPR (*8,9*). Persons who swim in natural bodies of water may be at increased risk because of additional hazards including changing environmental conditions (e.g., depth, currents, and weather); insufficient warning signs; murky or cloudy water; close proximity to watercraft; and inaccessibility of emergency medical services.

Drownings – Continued

In some states, laws have been enacted to establish basic safety requirements for natural swimming areas, including depth markings and warning signs, lifeguards, lifesaving equipment and first aid supplies, telephones for emergency use, safety plans, and restrictions on density (i.e., the number of persons allowed in a specified beach area). Further research is needed to evaluate the effectiveness of these drowning-prevention strategies. However, based on the results of the North Carolina investigation, states should strongly consider mandating basic safety requirements for natural swimming areas and discourage the use of algae-control methods that reduce water clarity.

References

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Current Trends

Drownings at U.S. Army Corps of Engineers Recreation Facilities, 1986–1990

The U.S. Army Corps of Engineers, Department of the Army, is the largest federal provider of water-based recreation facilities in the United States. Each year, the Corps records more than 2.3 billion visitor hours at its 460 lakes and reservoirs and estimates that 25 million persons visit one of its facilities at least once each year (*1*). Since 1986, the Corps has promoted water safety through educational campaigns at its facilities nationwide. The Corps, in collaboration with CDC, reviewed information about drownings and water-safety activities for 1986 through 1990 to assist in improving its water-safety programs. This report summarizes the assessment and describes water-safety measures the Corps is implementing to prevent drownings and other injuries.

The Corps compiles data on all deaths that occur at Corps recreation facilities. Data reported by park managers include demographic characteristics and information on the circumstances and locations of deaths.

From 1986 through 1990, 1107 persons drowned at Corps facilities. Of these, 334 (30%) were aged 16–25 years, 140 (13%) were aged 26–30 years, and 65 (6%) were children aged ≤5 years. Most persons who drowned (981 [89%]) were males. More than half of the drownings (572 [52%]) occurred on Saturday or Sunday (Figure 1).

Recreation Facilities — Continued

Rates of drowning (number per million visitor-days) were highest in 1986 (1.3) and lowest in 1988 (1.0); the death rate for drowning has remained stable after an initial decline in 1986.

For each year during 1986–1990, most drownings occurred during swimming and wading activities (488 [44%]), followed by boating activities (250 [23%]), and fishing from shore (187 [17%]) (Table 1). Of the swimming/wading-related drownings, 302 (62%) occurred outside the designated swimming areas.

Each Corps facility has at least one designated swimming area, which employs buoys to prohibit boat and personal watercraft entry and signs and markers to inform swimmers of the limits of the designated zone. Designated swimming areas also are cleared of any trees, stumps, and debris and are constructed to achieve maximum depth and slope requirements, to improve swimming safety.

FIGURE 1. Number of drownings at U.S. Army Corps of Engineers recreation facilities, by day of week, 1986–1990

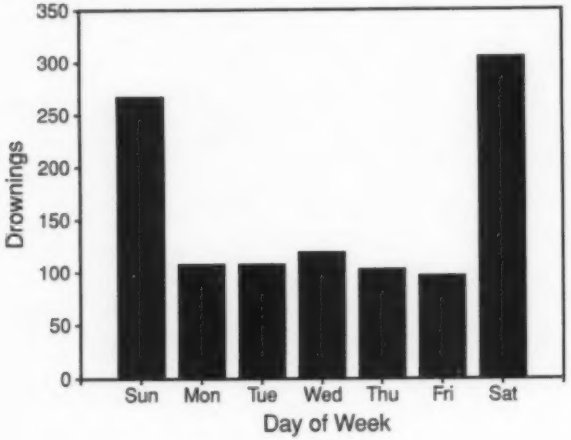

TABLE 1. Number of drownings at U.S. Army Corps of Engineers recreation facilities, by activity and year, and rates per million visitor-days, 1986–1990

Category	1986	1987	1988	1989	1990	Total
Activity						
Swimming/Wading	136	98	92	71	91	**488**
Boating	55	65	41	38	51	**250**
Fishing from shore	44	38	33	38	34	**187**
Other	43	37	27	50	25	**182**
Total	**278**	**238**	**193**	**197**	**201**	**1107**
Million visitor-days	**209**	**220**	**199**	**191**	**190**	**1010**
Rate per million visitor-days	**1.3**	**1.1**	**1.0**	**1.0**	**1.1**	**1.1**

Recreation Facilities — Continued

Since 1986, the Corps has promoted water safety nationwide through an annual, unified safety-education campaign, "Your Safety—Our Concern." This campaign has included audio and video tapes to be used as radio and television public service announcements and educational posters. In addition, the Corps uses permanent information and advisory posters at each facility to inform visitors to remain in designated swimming areas while swimming and wading.

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Editorial Note: The findings in this report are consistent with patterns of drowning described previously for the United States. In particular, the rate of drowning is four times greater for males than for females, and drowning rates are highest for children aged <5 years and persons aged 15–24 years (*2*).

Through its national water-safety program, the Corps has emphasized preventing water-related fatalities at its facilities. By continuing to review and evaluate the causes for water-related deaths, all public and private recreational facilities can improve their water-safety efforts. Additional efforts the Corps can employ at its recreational facilities include 1) restricting swimming and wading to designated swimming areas; 2) engaging park managers to encourage visitors to restrict their swimming and wading to designated areas; 3) enhancing patrolling efforts at beach areas to ensure that visitors are swimming and wading safely; and 4) improving coordination with state agencies to foster more visibility of the enforcement of state boating laws. In addition, the Corps' safety-awareness campaigns can address various topics including 1) warnings against alcohol consumption during water-based recreation activities (e.g., swimming and boating), 2) promoting the use of personal flotation devices, and 3) warnings against swimming alone.

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Epidemiologic Notes and Reports

Suction-Drain Injury in a Public Wading Pool — North Carolina, 1991

On June 16, 1991, a 3-year-old girl playing in a public wading pool sat on the pool's uncapped suction drain. The child appeared to be stuck on the drain, and the pool attendant quickly turned off the pool's suction pump. As a consequence of sitting on the drain, the child sustained severe internal injuries requiring surgical repair. This report summarizes the investigation of this incident by the North Carolina Department of Environment, Health, and Natural Resources (DEHNR) and describes safety measures to prevent injuries among children caused by pool suction drains.

Following the episode at the wading pool, the child was examined at a hospital and had perianal bruising and prolapse of the rectal mucosa. The prolapse was manually reduced, and a pelvic computerized tomography scan showed no evidence of a rectal leak; however, by June 17, she had evidence of localized peritonitis. An exploratory

Suction-Drain Injury — Continued

laparotomy revealed a long anterior laceration of the seromuscular layer of the rectosigmoid colon; the mucosal tube was intact but ischemic and was separated circumferentially from the outer layers of the bowel wall. The laceration was repaired and a sigmoid colostomy performed.

The investigation by the DEHNR revealed that the wading pool where this injury occurred had a three-quarter–horsepower suction pump that was not linked to the adjacent adult pool or any other outlet. At the time of the injury, the antivortex drain cover that had previously covered the drain had been removed. Since the incident, the antivortex drain cover has been secured to the drain to prevent further suction injuries.

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Editorial Note: The findings in this investigation are consistent with those from previous reports of abdominal injuries among children who sit directly on uncovered openings or vents capable of forming a strong vacuum when covered (*1*). When a child sits on an unprotected suction-drain vent, the child's perineum can form a firm seal that creates a vacuum capable of relaxing the anal sphincter. This negative pressure on the exposed rectal walls can result in prolapse or intussusception; this, in turn, usually produces a full-thickness anterior bowel tear, creating the potential for evisceration of the mobile small intestine through the laceration and the anal canal. Damage to the mesentery can produce extensive irreversible small bowel ischemia requiring resection.

Since May 1, 1991, North Carolina has required all newly constructed public wading pools to be equipped with a surface skimmer and with interconnected double drains to prevent suction-drain injuries. However, pools constructed before May 1, 1991, have been allowed to continue operating with a single drain. The public pool involved in this incident was built before the standards became effective; however, the pool had been inspected 12 months before the injury occurred and had had an antisuction cover in place over the drain opening at that time.

Because a child may be injured within seconds of sitting on a drain, adult supervision alone does not effectively prevent suction-drain injuries. Suction-drain injuries can be prevented through interventions that prevent vacuums from forming when the vents are covered. Existing pools that may have a single suction-drain or multiple suction-drains that can be isolated by valves should be equipped with antivortex covers or with grates at least 12 inches by 12 inches over the drains to prevent the possibility of a vacuum forming if a child sits on a suction-drain opening (*2*). In addition, standards of the American National Standards Institute/National Spa and Pool Institute and the American Public Health Association specify that drain covers be secured in a way to prevent removal without special tools (*2,3*). Also, maintenance personnel should routinely inspect pool drains to ensure covers remain secure. Pools should not be operated if a suction-drain cover is missing, broken, or inadequately secured (*2*).

For new pools, water circulation systems should be constructed so that suction pumps are linked with more than one drain outlet; for example, the pump may draw water from two drains in the deepest part of the pool or from one drain and a surface skimmer, thus preventing a tight seal from forming if one drain is covered. In addition

Suction-Drain Injury — Continued

to these barriers, water-safety instruction courses should include specific instructions on the prevention of injuries involving pool equipment.

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Current Trends

Alcohol Use and Horseback-Riding–Associated Fatalities — North Carolina, 1979–1989

In the United States, an estimated 30 million persons ride horses each year (*1*). Total injury-related morbidity and mortality associated with horseback riding in the United States is unknown; however, during 1976–1987, 205 such fatalities occurred in 27 states (*2*). Even though alcohol use is a risk behavior for many types of injury, its role in horseback-riding–associated deaths has not yet been established. This report summarizes a study by the North Carolina Office of the Chief Medical Examiner (OCME) to characterize all horseback-riding–associated deaths during 1979–1989 and to determine what proportion of riders had used alcohol before death.

Thirty horseback-riding (including mule-riding)–associated deaths were identified; on average, one to three occurred each year. Sixteen (53%) decedents were male. Decedents' ages ranged from 7 to 68 years (median: 33.5 years).

Twenty-five persons were mounted on a horse at the time of the fatal event; four persons were trampled or kicked; and for one person, rider status was unknown. Twenty-one (70%) riders died when they fell or were thrown from the horse. Twenty (67%) riders died following head injuries (including one rider who drowned after striking his head, losing consciousness, and rolling into water); nine (30%) riders died from internal chest or abdominal injuries; and one rider drowned when he rode his horse into a lake.

Of 18 decedents tested for blood alcohol, six (33%) had detectable blood alcohol concentrations (BACs) of 0.6–3.6 g/dL (Table 1, page 341). Of 13 decedents who fell or were thrown from their horses, five (39%) had detectable BACs; none of the four decedents who were kicked or trampled had detectable BACs; and the rider who drowned had a BAC of 0.9 g/dL.

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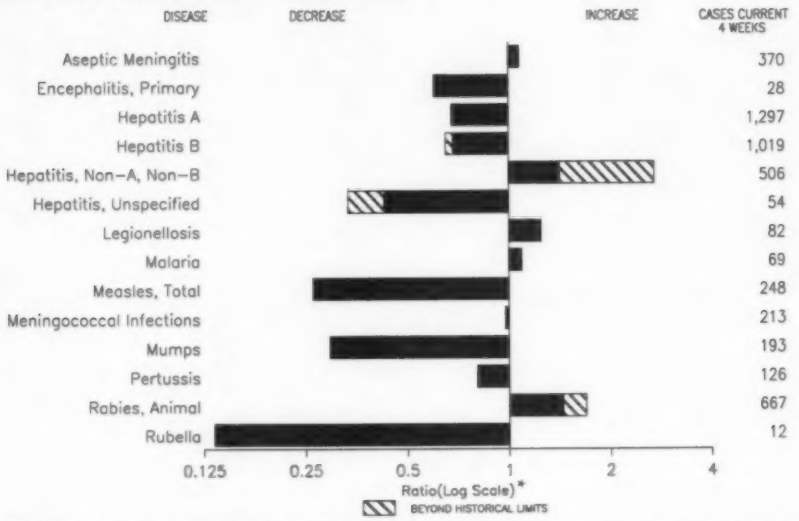
Editorial Note: Although estimates of the proportion of horseback-riding–associated injuries related to alcohol use have not previously been reported, the proportion of horseback-riding–associated deaths related to alcohol use in this report is similar to

(Continued on page 341)

FIGURE I. Notifiable disease reports, comparison of 4-week totals ending May 9, 1992, with historical data — United States



*Ratio of current 4-week total to mean of 15 4-week totals (from previous, comparable, and subsequent 4-week periods for the past 5 years). The point where the hatched area begins is based on the mean and two standard deviations of these 4-week totals.

TABLE I. Summary — cases of specified notifiable diseases, United States, cumulative, week ending May 9, 1992 (19th Week)

	Cum. 1992		Cum. 1992
AIDS*	16,200	Measles: imported	64
Anthrax	-	indigenous	745
Botulism: Foodborne	8	Plague	-
Infant	19	Poliomyelitis, Paralytic†	-
Other	-	Psittacosis	26
Brucellosis	12	Rabies, human	-
Cholera	31	Syphilis, primary & secondary	12,857
Congenital rubella syndrome	4	Syphilis, congenital, age < 1 year	-
Diphtheria	2	Tetanus	6
Encephalitis, post-infectious	43	Toxic shock syndrome	92
Gonorrhea	175,258	Trichinosis	12
Haemophilus influenzae (invasive disease)	632	Tuberculosis	7,065
Hansen Disease	44	Tularemia	22
Leptospirosis	10	Typhoid fever	112
Lyme Disease	1,351	Typhus fever, tickborne (RMSF)	59

*Updated monthly; last update May 2, 1992.
†Nine suspected cases of poliomyelitis were reported in 1991; 4 of the 8 suspected cases in 1990 were confirmed, and all were vaccine associated.

TABLE II. Cases of selected notifiable diseases, United States, weeks ending May 9, 1992, and May 11, 1991 (19th Week)

Reporting Area	AIDS*	Aseptic Meningitis	Encephalitis		Gonorrhea		Hepatitis (Viral), by type				Legionellosis	Lyme Disease
			Primary	Post-infectious			A	B	NA,NB	Unspecified		
	Cum. 1992	Cum. 1992	Cum. 1992	Cum. 1992	Cum. 1992	Cum. 1991	Cum. 1992	Cum. 1992	Cum. 1992	Cum. 1992	Cum. 1992	Cum. 1992
UNITED STATES	16,200	1,690	186	43	175,258	206,495	6,721	5,405	1,907	234	467	1,351
NEW ENGLAND	562	110	13	-	3,779	5,455	242	218	25	16	36	95
Maine	18	10	-	-	35	42	29	12	3	-	2	-
N.H.	19	4	2	-	-	128	16	18	9	1	3	5
Vt.	8	4	1	-	10	16	2	5	2	-	2	1
Mass.	313	39	7	-	1,397	2,319	114	154	8	15	19	34
R.I.	32	53	3	-	311	424	56	16	3	-	10	34
Conn.	172	-	-	-	2,026	2,526	25	13	-	-	-	21
MID. ATLANTIC	3,733	199	10	5	17,496	26,076	527	723	151	12	144	1,027
Upstate N.Y.	558	88	-	-	3,387	4,503	140	180	90	6	59	701
N.Y. City	1,942	26	2	1	5,714	10,517	171	90	3	-	3	-
N.J.	742	4	-	-	2,464	3,787	68	172	42	-	23	79
Pa.	491	81	8	4	5,931	7,268	148	281	16	6	59	247
E.N. CENTRAL	1,515	244	53	7	28,726	39,060	784	695	92	11	95	31
Ohio	267	72	22	1	10,150	12,084	178	105	44	-	48	20
Ind.	154	21	5	-	3,122	3,748	255	179	3	3	6	5
Ill.	619	51	11	3	10,312	11,437	147	56	13	2	4	2
Mich.	364	96	14	3	3,998	9,208	56	225	7	6	27	4
Wis.	91	4	1	-	1,144	2,583	148	130	25	-	10	-
W.N. CENTRAL	498	106	12	4	9,079	10,188	744	291	160	8	24	37
Minn.	88	9	1	-	1,033	1,029	234	21	6	2	1	1
Iowa	28	23	-	2	651	680	19	13	1	1	4	6
Mo.	264	40	8	-	5,370	6,291	191	222	147	5	8	25
N. Dak.	1	1	-	-	25	27	32	1	1	-	1	2
S. Dak.	3	3	-	1	69	134	151	2	-	-	-	-
Nebr.	18	9	1	1	4	668	58	12	-	-	9	1
Kans.	96	21	2	-	1,927	1,359	59	20	5	-	1	2
S. ATLANTIC	3,885	378	30	19	62,096	61,426	434	932	141	35	66	71
Del.	38	13	4	-	591	846	11	82	-	1	10	31
Md.	474	52	7	-	5,602	6,318	86	153	15	6	12	6
D.C.	330	7	-	-	2,793	3,746	7	40	-	-	7	-
Va.	205	69	6	6	6,829	5,873	42	70	15	13	6	18
W. Va.	24	1	1	-	324	443	4	22	-	5	-	1
N.C.	174	40	9	-	9,229	11,462	28	136	35	-	10	6
S.C.	145	6	-	-	4,025	4,632	9	22	-	-	15	-
Ga.	504	38	1	-	18,855	15,772	48	116	38	-	-	1
Fla.	1,991	152	2	13	13,848	12,334	199	291	38	10	6	8
E.S. CENTRAL	532	80	6	-	17,441	18,328	113	469	751	1	20	15
Ky.	62	33	4	-	1,690	1,956	25	32	-	-	11	4
Tenn.	157	20	1	-	5,473	7,084	56	390	747	-	7	10
Ala.	215	19	-	-	5,992	4,401	19	45	4	1	2	1
Miss.	98	8	1	-	4,286	4,887	13	2	-	-	-	-
W.S. CENTRAL	1,525	142	16	3	16,694	23,015	570	596	26	46	8	16
Ark.	79	8	7	-	3,241	2,420	37	39	5	3	-	2
La.	267	10	-	-	2,102	5,400	43	55	-	1	-	-
Okla.	100	-	1	2	1,792	2,343	77	91	15	2	4	6
Tex.	1,079	124	8	1	9,559	12,852	413	411	6	40	4	8
MOUNTAIN	462	50	9	1	3,921	4,189	1,002	270	81	26	35	1
Mont.	5	-	1	-	35	34	30	19	14	-	5	-
Idaho	7	5	-	-	48	63	20	27	1	-	3	-
Wyo.	3	-	-	-	18	42	1	2	5	-	1	-
Colo.	174	15	4	1	1,311	1,147	278	45	25	14	5	-
N. Mex.	43	6	3	-	322	394	122	87	11	6	2	-
Ariz.	120	16	1	-	1,377	1,581	458	46	11	2	11	-
Utah	40	-	-	-	80	129	65	3	8	4	1	1
Nev.	70	8	-	-	730	799	28	41	6	-	7	-
PACIFIC	3,488	351	37	4	16,026	18,759	2,305	1,211	480	79	39	58
Wash.	174	-	-	-	1,480	1,866	230	103	49	5	3	2
Oreg.	105	-	-	-	542	733	145	110	25	6	-	-
Calif.	3,142	340	34	3	13,539	15,883	1,841	988	404	67	35	56
Alaska	8	2	3	-	272	266	12	5	2	1	-	-
Hawaii	59	39	-	1	193	211	77	5	-	-	1	-
Guam	-	-	-	-	37	-	5	2	-	2	-	1
P.R.	498	53	-	-	61	238	9	119	6	4	1	-
V.I.	2	-	-	-	40	222	5	4	-	-	-	-
Amer. Samoa	-	-	-	-	13	18	-	1	-	-	-	-
C.N.M.I.	-	-	-	-	28	19	-	-	-	-	-	-

N: Not notifiable U: Unavailable C.N.M.I.: Commonwealth of the Northern Mariana Islands
*Updated monthly; last update May 2, 1992.

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending May 9, 1992, and May 11, 1991 (19th Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported*		Total									
	Cum. 1992	1992	Cum. 1992	1992	Cum. 1992	Cum. 1991	Cum. 1992	1992	Cum. 1992	1992	Cum. 1992	Cum. 1991	1992	Cum. 1992	Cum. 1991
UNITED STATES	273	50	745	4	64	5,133	942	60	1,049	25	468	767	3	58	620
NEW ENGLAND	12	-	3	-	5	20	57	1	2	3	43	98	-	4	1
Maine	-	-	-	-	-	-	6	-	-	-	2	4	-	-	-
N.H.	2	-	1	-	-	-	4	-	-	-	15	12	-	-	1
Vt.	-	-	-	-	-	5	2	-	-	-	-	3	-	-	-
Mass.	5	-	2	-	3	7	22	-	1	3	22	71	-	-	-
R.I.	2	-	-	-	-	-	-	-	-	-	-	-	-	4	-
Conn.	3	-	-	-	2	8	23	1	1	-	4	8	-	-	-
MID. ATLANTIC	78	11	140	-	6	3,288	94	5	78	2	55	81	-	10	244
Upstate N.Y.	11	11	55	-	1	189	44	2	31	1	19	48	-	6	230
N.Y. City	38	-	26	-	1	1,000	9	-	8	-	4	-	-	-	-
N.J.	16	-	58	-	1	800	17	-	14	-	9	7	-	4	-
Pa.	13	-	1	-	3	1,299	24	3	25	1	23	26	-	-	14
E.N. CENTRAL	15	7	19	-	8	64	128	9	130	2	35	153	-	5	162
Ohio	2	-	2	-	3	1	34	5	51	-	14	56	-	-	147
Ind.	4	6	16	-	-	1	12	1	5	2	10	28	-	-	1
Ill.	3	-	-	-	4	24	39	1	36	-	4	32	-	5	3
Mich.	5	1	1	-	-	33	36	2	36	-	1	20	-	-	11
Wis.	1	-	-	-	1	5	7	-	2	-	6	17	-	-	-
W.N. CENTRAL	14	-	5	1	1	28	45	4	32	1	34	58	-	3	10
Minn.	5	-	3	-	-	5	7	-	5	-	13	21	-	-	4
Iowa	2	-	-	1§	1	15	6	1	6	-	1	5	-	-	3
Mo.	4	-	1	-	-	-	16	3	15	-	13	20	-	-	3
N. Dak.	-	-	-	-	-	-	-	-	2	-	3	1	-	-	-
S. Dak.	1	-	-	-	-	-	1	-	-	1	2	1	-	-	-
Nebr.	-	-	-	-	-	-	5	-	2	-	2	4	-	-	-
Kans.	2	-	1	-	-	8	10	-	2	-	-	6	-	3	-
S. ATLANTIC	56	1	94	3	8	279	163	6	430	1	58	52	1	4	4
Del.	4	-	2	-	-	20	2	1	3	-	-	-	-	-	-
Md.	15	1	2	3§	7	115	16	1	37	1	15	6	-	-	1
D.C.	4	-	-	-	-	-	-	-	2	-	-	-	-	1	1
Va.	13	-	5	-	1	21	29	-	20	-	4	9	-	-	-
W. Va.	-	-	-	-	-	-	13	-	15	-	3	6	-	-	-
N.C.	6	-	21	-	-	1	28	-	82	-	13	7	-	-	-
S.C.	-	-	29	-	-	12	12	-	46	-	9	-	-	-	-
Ga.	2	-	-	-	-	-	22	-	24	-	4	16	-	-	-
Fla.	12	-	35	-	-	110	41	4	201	-	10	8	1	3	2
E.S. CENTRAL	4	25	352	-	16	1	65	1	26	1	8	19	-	1	83
Ky.	-	25	350	-	-	-	25	-	-	-	-	-	-	-	-
Tenn.	1	-	-	-	-	1	15	-	10	-	5	9	-	1	83
Ala.	3	-	-	-	-	-	23	1	5	1	3	10	-	-	-
Miss.	-	-	2	-	16	-	2	-	11	-	-	-	-	-	-
W.S. CENTRAL	2	4	66	-	-	22	69	29	168	3	17	18	-	-	1
Ark.	-	-	-	-	-	5	10	-	4	-	8	-	-	-	1
La.	-	-	-	-	-	-	11	-	12	-	-	8	-	-	-
Okla.	2	4	4	-	-	-	7	8	12	3	9	10	-	-	-
Tex.	-	-	62	-	-	17	41	21	140	-	-	-	-	-	-
MOUNTAIN	11	-	1	-	4	308	54	1	66	4	83	105	1	2	3
Mont.	-	-	-	-	-	-	11	-	-	1	1	-	-	-	-
Idaho	-	-	-	-	-	3	8	-	2	-	13	15	-	1	-
Wyo.	-	-	1	-	-	-	2	-	-	-	-	3	-	-	-
Colo.	5	-	-	-	4	2	9	-	4	1	20	53	-	-	1
N. Mex.	1	-	-	-	-	95	3	N	N	2	16	15	-	-	1
Ariz.	4	-	-	-	-	185	11	-	42	-	27	8	1	1	-
Utah	-	-	-	-	-	10	4	-	13	-	5	10	-	-	-
Nev.	1	-	-	-	-	13	6	1	5	-	1	1	-	-	1
PACIFIC	81	2	65	-	16	1,123	267	4	117	8	135	183	1	29	112
Wash.	6	-	-	-	7	4	35	-	6	5	38	45	-	-	-
Oreg.	7	-	3	-	1	33	41	N	N	1	13	31	-	1	1
Calif.	63	1	38	-	6	1,083	182	3	107	2	79	71	1	28	109
Alaska	1	-	8	-	1	1	6	-	-	-	-	10	-	-	-
Hawaii	4	1	16	-	1	2	3	1	4	-	5	26	-	-	2
Guam	1	U	7	U	3	-	-	U	5	U	-	-	U	-	-
P.R.	-	-	5	-	-	39	3	-	1	-	8	13	-	-	-
V.I.	-	-	-	-	-	2	-	1	11	-	-	-	-	-	-
Amer. Samoa	-	-	-	-	-	24	-	-	-	-	6	-	-	-	-
C.N.M.I.	-	U	-	U	-	-	-	U	-	U	1	-	U	-	-

*For measles only, imported cases includes both out-of-state and international importations.
N: Not notifiable U: Unavailable †International §Out-of-state

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending May 9, 1992, and May 11, 1991 (19th Week)

Reporting Area	Syphilis (Primary & Secondary)		Toxic-shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1992	Cum. 1991	Cum. 1992	Cum. 1992	Cum. 1991	Cum. 1992	Cum. 1992	Cum. 1992	Cum. 1992
UNITED STATES	12,857	15,548	92	7,065	7,329	22	112	59	2,909
NEW ENGLAND	228	417	9	204	201	-	10	2	264
Maine	-	-	-	26	16	-	-	-	-
N.H.	-	10	6	-	-	-	-	-	1
Vt.	1	1	-	2	1	-	-	-	-
Mass.	167	207	2	58	100	-	7	1	2
R.I.	15	16	1	81	20	-	-	1	-
Conn.	105	183	-	37	64	-	3	-	261
MID. ATLANTIC	1,951	2,732	11	1,684	1,647	-	33	1	896
Upstate N.Y.	139	103	4	100	115	-	5	-	543
N.Y. City	1,025	1,384	-	1,067	999	-	12	-	-
N.J.	251	539	-	270	308	-	12	-	261
Pa.	536	706	7	247	225	-	4	1	92
E.N. CENTRAL	1,563	1,715	24	660	816	-	12	5	39
Ohio	263	222	8	121	118	-	2	4	1
Ind.	88	52	2	66	58	-	-	-	2
Ill.	748	822	4	381	440	-	9	-	9
Mich.	240	431	10	58	164	-	1	-	4
Wis.	224	188	-	34	36	-	-	1	23
W.N. CENTRAL	508	280	12	137	205	5	1	2	563
Minn.	32	27	2	30	35	-	-	-	122
Iowa	12	23	3	13	29	-	-	-	72
Mo.	397	170	1	58	86	4	1	2	4
N. Dak.	1	1	1	2	4	-	-	-	50
S. Dak.	-	1	-	11	13	-	-	-	50
Nebr.	1	7	3	3	8	1	-	-	2
Kans.	65	51	2	20	30	-	-	-	263
S. ATLANTIC	3,653	4,735	10	1,357	1,292	3	10	15	587
Del.	83	57	2	11	11	-	-	-	96
Md.	280	385	1	100	118	2	1	-	189
D.C.	170	303	-	51	77	-	1	-	9
Va.	287	402	1	100	99	1	-	-	104
W. Va.	6	11	-	23	34	-	1	-	16
N.C.	874	701	3	193	143	-	-	11	2
S.C.	473	562	1	135	148	-	1	2	44
Ga.	760	1,135	1	306	253	-	-	-	122
Fla.	720	1,179	1	438	409	-	6	2	5
E.S. CENTRAL	1,782	1,617	-	425	516	4	2	2	54
Ky.	48	30	-	133	125	1	-	1	31
Tenn.	444	587	-	94	152	3	-	1	-
Ala.	784	587	-	147	126	-	-	-	23
Miss.	506	413	-	51	113	-	2	-	-
W.S. CENTRAL	2,299	2,726	1	625	748	6	1	30	255
Ark.	366	194	-	41	68	3	-	6	16
La.	909	872	-	27	68	-	-	-	-
Okla.	98	57	-	33	42	3	-	24	130
Tex.	926	1,603	1	524	570	-	1	-	109
MOUNTAIN	160	222	9	211	193	4	2	1	54
Mont.	2	1	-	-	-	-	-	-	6
Idaho	1	3	1	11	2	-	1	-	-
Wyo.	1	1	-	-	2	1	-	-	21
Colo.	19	25	2	16	6	-	1	-	1
N. Mex.	17	13	2	26	9	3	-	-	2
Ariz.	75	156	2	111	120	-	-	-	23
Utah	4	4	2	24	25	-	-	1	1
Nev.	41	19	-	23	29	-	-	-	-
PACIFIC	713	1,102	16	1,762	1,711	-	41	1	197
Wash.	32	64	-	109	116	-	2	-	-
Oreg.	21	28	-	38	35	-	-	-	-
Calif.	650	1,003	16	1,511	1,485	-	38	1	187
Alaska	1	3	-	21	27	-	-	-	10
Hawaii	9	4	-	83	48	-	1	-	-
Guam	2	-	-	34	-	-	1	-	-
P.R.	114	170	-	55	71	-	-	-	20
V.I.	23	47	-	3	1	-	-	-	-
Amer. Samoa	-	-	-	-	2	-	-	-	-
C.N.M.I.	4	-	-	12	4	-	1	-	-

U: Unavailable

TABLE III. Deaths in 121 U.S. cities,* week ending May 9, 1992 (19th Week)

Reporting Area	All Causes, By Age (Years)						P&I†
	All Ages	≥65	45-64	25-44	1-24	<1	Total
NEW ENGLAND	624	447	96	57	9	14	50
Boston, Mass.	182	115	26	28	4	8	12
Bridgeport, Conn.	28	18	6	3	-	1	-
Cambridge, Mass.	24	19	2	3	-	-	6
Fall River, Mass.	32	28	1	3	-	-	2
Hartford, Conn.	50	32	14	3	-	1	2
Lowell, Mass.	36	30	4	2	-	-	2
Lynn, Mass.	10	9	1	-	-	-	2
New Bedford, Mass.	24	21	1	1	1	-	1
New Haven, Conn.	47	31	8	4	2	2	4
Providence, R.I.	44	34	8	1	1	-	-
Somerville, Mass.	3	2	1	-	-	-	-
Springfield, Mass.	48	34	7	6	-	1	5
Waterbury, Conn.	35	26	7	2	-	-	3
Worcester, Mass.	61	48	10	1	1	1	11
MID. ATLANTIC	2,420	1,576	463	272	50	59	126
Albany, N.Y.	60	40	12	4	2	2	8
Allentown, Pa.	20	16	1	3	-	-	3
Buffalo, N.Y.	118	78	30	6	1	3	5
Camden, N.J.	40	19	15	3	3	-	1
Elizabeth, N.J.	37	31	3	3	-	-	-
Erie, Pa.§	57	44	7	4	-	2	3
Jersey City, N.J.	41	25	6	7	1	2	5
New York City, N.Y.	1,218	746	243	179	29	21	54
Newark, N.J.	72	34	12	14	5	7	3
Paterson, N.J.	U	U	U	U	U	U	U
Philadelphia, Pa.	385	281	65	27	6	6	19
Pittsburgh, Pa.§	67	34	18	3	1	11	1
Reading, Pa.	12	11	-	1	-	-	1
Rochester, N.Y.	109	72	24	10	-	3	8
Schenectady, N.Y.	22	17	4	1	-	-	1
Scranton, Pa.§	23	20	3	-	-	-	1
Syracuse, N.Y.	79	59	13	5	1	1	5
Trenton, N.J.	25	19	3	2	-	1	4
Utica, N.Y.	13	11	1	-	1	-	2
Yonkers, N.Y.	22	19	3	-	-	-	2
E.N. CENTRAL	2,216	1,379	442	227	117	50	149
Akron, Ohio	39	33	1	5	-	-	-
Canton, Ohio	32	23	9	-	-	-	8
Chicago, Ill.	535	249	103	98	75	10	26
Cincinnati, Ohio	131	92	28	7	2	2	18
Cleveland, Ohio	153	87	36	12	7	11	6
Columbus, Ohio	189	127	40	17	1	4	10
Dayton, Ohio	101	72	17	10	1	1	8
Detroit, Mich.	228	119	54	33	12	10	8
Evansville, Ind.	60	40	16	2	1	1	1
Fort Wayne, Ind.	53	41	6	3	3	-	4
Gary, Ind.	20	11	6	2	1	-	1
Grand Rapids, Mich.	65	49	10	4	2	-	4
Indianapolis, Ind.	166	107	39	15	3	2	14
Madison, Wis.	30	22	4	2	-	2	3
Milwaukee, Wis.	120	89	21	7	1	2	11
Peoria, Ill.	47	33	11	2	-	1	6
Rockford, Ill.	40	31	6	1	-	2	6
South Bend, Ind.	42	32	9	-	1	-	5
Toledo, Ohio	107	76	16	6	7	2	10
Youngstown, Ohio	58	46	10	1	-	-	-
W.N. CENTRAL	711	520	123	43	15	10	33
Des Moines, Iowa	69	56	11	2	-	-	9
Duluth, Minn.	32	31	-	1	-	-	3
Kansas City, Kans.	15	13	2	-	-	-	-
Kansas City, Mo.	110	76	21	7	5	1	4
Lincoln, Nebr.	37	30	6	-	1	-	4
Minneapolis, Minn.	159	119	25	10	4	1	5
Omaha, Nebr.	71	44	15	7	1	4	4
St. Louis, Mo.	121	82	24	11	2	2	-
St. Paul, Minn.	50	37	8	2	1	2	2
Wichita, Kans.	47	32	11	3	1	-	2

Reporting Area	All Causes, By Age (Years)						P&I†
	All Ages	≥65	45-64	25-44	1-24	<1	Total
S. ATLANTIC	1,275	748	273	167	42	45	67
Atlanta, Ga.	119	55	36	19	7	2	1
Baltimore, Md.	173	109	29	29	4	2	16
Charlotte, N.C.	90	46	27	11	1	5	2
Jacksonville, Fla.	106	59	33	8	4	2	9
Miami, Fla.	144	74	31	29	6	4	1
Norfolk, Va.	55	38	8	5	1	3	5
Richmond, Va.	87	59	14	8	3	3	4
Savannah, Ga.	52	31	13	6	1	1	5
St. Petersburg, Fla.	85	65	6	5	1	8	-
Tampa, Fla.	116	80	18	12	2	4	14
Washington, D.C.	222	114	53	34	10	11	10
Wilmington, Del.	26	18	5	1	2	-	-
E.S. CENTRAL	819	524	158	81	28	27	69
Birmingham, Ala.	106	67	14	12	6	6	9
Chattanooga, Tenn.	61	36	17	4	2	2	5
Knoxville, Tenn.	77	53	15	7	2	-	4
Louisville, Ky.	133	83	28	12	7	3	4
Memphis, Tenn.	210	122	39	29	9	11	26
Mobile, Ala.	60	41	14	3	-	2	7
Montgomery, Ala.	48	34	9	4	-	1	-
Nashville, Tenn.	124	88	22	10	2	2	14
W.S. CENTRAL	1,539	899	336	159	56	89	80
Austin, Tex.	57	37	12	3	2	3	3
Baton Rouge, La.	81	45	26	9	-	1	4
Corpus Christi, Tex.	51	38	8	4	1	-	6
Dallas, Tex.	216	126	38	28	18	6	2
El Paso, Tex.	62	44	9	6	1	2	3
Ft. Worth, Tex.	78	46	20	9	2	1	4
Houston, Tex.	449	196	119	54	15	65	35
Little Rock, Ark.	60	41	12	4	2	1	1
New Orleans, La.	125	83	22	12	6	2	-
San Antonio, Tex.	231	156	45	20	7	3	13
Shreveport, La.	39	29	7	1	2	-	4
Tulsa, Okla.	90	58	18	9	-	5	5
MOUNTAIN	772	511	141	74	28	18	62
Albuquerque, N.M.	85	56	12	7	7	3	2
Colo. Springs, Colo.	34	26	5	1	2	-	2
Denver, Colo.	109	73	19	9	6	2	13
Las Vegas, Nev.	123	82	19	18	4	-	4
Ogden, Utah	22	17	3	1	1	-	3
Phoenix, Ariz.	167	99	43	17	2	6	24
Pueblo, Colo.	20	16	2	1	1	-	2
Salt Lake City, Utah	77	51	15	6	1	4	4
Tucson, Ariz.	135	91	23	14	4	3	8
PACIFIC	1,818	1,196	328	192	57	34	105
Berkeley, Calif.	23	14	4	2	2	1	-
Fresno, Calif.	37	22	6	4	3	2	3
Glendale, Calif.	26	19	5	1	-	1	-
Honolulu, Hawaii	64	43	13	6	-	2	11
Long Beach, Calif.	81	52	16	11	2	-	10
Los Angeles, Calif.	509	308	84	76	24	6	22
Pasadena, Calif.	29	23	3	1	1	1	2
Portland, Oreg.	108	75	16	13	2	2	5
Sacramento, Calif.	144	98	26	11	3	6	9
San Diego, Calif.	127	78	25	16	3	5	16
San Francisco, Calif.	169	105	41	19	3	1	-
San Jose, Calif.	174	116	39	11	4	4	10
Santa Cruz, Calif.	31	23	5	3	-	-	2
Seattle, Wash.	184	136	26	14	7	1	7
Spokane, Wash.	40	31	7	1	-	1	3
Tacoma, Wash.	72	53	12	3	3	1	5
TOTAL	12,194¶	7,800	2,360	1,272	402	346	741

*Mortality data in this table are voluntarily reported from 121 cities in the United States, most of which have populations of 100,000 or more. A death is reported by the place of its occurrence and by the week that the death certificate was filed. Fetal deaths are not included.
†Pneumonia and influenza.
§Because of changes in reporting methods in these 3 Pennsylvania cities, these numbers are partial counts for the current week. Complete counts will be available in 4 to 6 weeks.
¶Total includes unknown ages.
U: Unavailable

Horseback Riding — Continued

that for other unintentional injury-related deaths in North Carolina and in other locations. For example, in North Carolina during 1973–1983, alcohol was detected in 48.6% of all persons who died from unintentional injuries (including those caused by motor-vehicle crashes) and who were tested for alcohol as part of the OCME's system (*3*). In Sacramento, California, during 1967–1969, 37% of persons who died from falls and 26% of those who died from fire-related injuries had consumed alcohol before death (*4*).

The findings in this investigation are subject to at least two limitations. First, complete information on the circumstances of the fatal event (e.g., risk factors and use of protective equipment such as helmets) was not available. Second, these findings may not be generalizable to horseback riders elsewhere in the United States because no comparable baseline information (e.g., hours of riding, hours of safety courses taken by decedents, and helmet use) is available.

Horseback riding requires coordination, timing, and communication of physical signals between horse and rider (*5*); alcohol use may impair equestrians, as it does operators of motor vehicles, by adversely effecting coordination and judgment and by lengthening reaction time (*6*). An alcohol-impaired rider may be unable to adjust to the horse's movements and may frighten the horse by unfamiliar actions. As with other transportation and recreational activities, use of helmets can prevent or reduce head injuries to persons riding horses (*7,8*), regardless of alcohol use. Horseback riders should wear a properly secured hard shell helmet lined with expanded polystyrene or similar material.

References

1. Bixby-Hammett DM. Accidents in equestrian sports. Am Fam Physician 1987;36:209–14.
2. Bixby-Hammett D, Brooks WH. Common injuries in horseback riding. Sports Med 1990;9:36–47.

TABLE 1. Characteristics of fatal horseback-riding–associated injuries among decedents tested for blood alcohol concentrations (BACs) — North Carolina, 1979–1989

Yr. of injury	Age (yrs)	Sex	Mounted	Injury	Cause of injury	BAC (g/dL)
1982	27	M	Yes	Head injury	Thrown	Negative
1983	68	M	Yes	Head injury	Fell from mule	Negative
1983	23	M	Yes	Head injury	Fell from horse	Negative
1983	14	F	Yes	Abdominal injury	Horse and rider fell	Negative
1983	42	M	Yes	Drowning	Rode into lake	0.9
1984	30	M	Yes	Head injury	Fell from horse	3.6
1985	7	F	No	Head injury	Kicked	Negative
1985	26	F	Yes	Head injury	Thrown	0.6
1985	21	M	Yes	Head injury	Thrown	0.7
1986	43	M	Yes	Clavicle fracture with arterial avulsion	Thrown	Negative
1987	32	F	No	Liver laceration	Trampled	Negative
1988	61	M	No	Crushed chest	Trampled by wagon mule team	Negative
1988	15	F	Yes	Spinal hemorrhage	Fell from horse	Negative
1988	41	F	Yes	Head injury	Horse and rider fell	Negative
1989	7	F	No	Trunk injuries	Trampled	Negative
1989	46	F	Yes	Head injuries	Thrown	Negative
1989	34	M	Yes	Chest injuries	Thrown and trampled	3.1
1989	39	M	Yes	Abdominal injuries	Thrown	2.6

Horseback Riding — Continued

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Epidemiologic Notes and Reports

Outbreak of Pharyngoconjunctival Fever at a Summer Camp — North Carolina, 1991

On July 19, 1991, the Communicable Disease Section of the North Carolina Department of Environment, Health, and Natural Resources (DEHNR) was notified that an outbreak of acute upper respiratory illness had occurred in campers and counselors at a 4-week summer camp. Manifestations of the illness included pharyngitis, cough, fever to 104 F (40 C), headache, myalgia, malaise, and conjunctivitis. On August 2, the DEHNR was notified of a similar outbreak during a second 4-week session at the camp. The epidemiologic investigation, initiated by the DEHNR on August 7, identified the cause as pharyngoconjunctival fever (PCF) associated with infection with adenovirus type 3. This report summarizes findings from the investigation.

The first camp session (June 16–July 12) was attended by 768 boys aged 7–16 years and 300 counselors aged 17–22 years. On July 12, first-session campers returned home, but counselors remained at the camp for the second session (July 14–August 9), which 800 boys attended. Approximately 700 persons swam each day in a 1-acre, manmade pond that had a maximum depth of 10 feet. Well water was continuously pumped into the pond at multiple sites through pipes located one foot below the surface of the water; the water overflowed, through a spillway, into an adjacent river. An automatic chlorination system treated the water before it entered the pond. The pond water was turbid, and plants grew in the bottom of the pond.

During the first session, 226 persons (175 campers and 51 staff members [i.e., counselors, administrative staff, and infirmary personnel]) visited the camp infirmary because of onset of symptoms of upper respiratory illness. During the second session, 369 campers and 86 staff members visited the infirmary with the same upper respiratory manifestations noted during the first session.

A convenience sample of 181 campers from the second session and 40 staff members at the camp was interviewed. A case of PCF was defined as two of four symptoms—sore throat, fever, cough, and red eyes—lasting more than 1 day. The attack rate for those surveyed was 112 (52%) (88 campers [Figure 1] and 24 staff members) of 216; duration of illness was unknown for five persons.

Every camper swam at least once during the 4 weeks; 158 (90%) of 175 swam one or more times per day. The attack rate for campers who swam daily (74 [48%] of 153) did not differ significantly from that for campers who swam less than once per week

Pharyngoconjunctival Fever — Continued

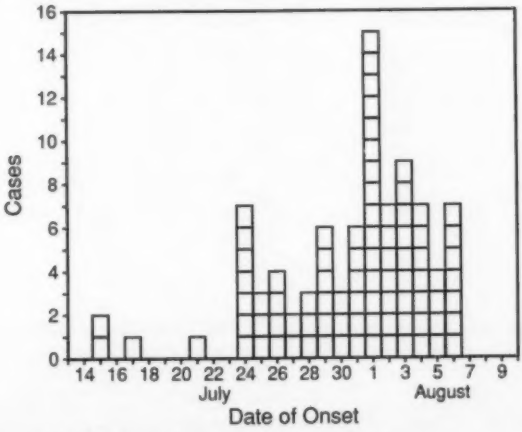
(11 [65%] of 17 [relative risk (RR) = 0.8; 95% confidence interval (CI) = 0.5–1.3]). The attack rate for staff who swam was higher than that for staff who did not swim (10 [77%] of 13 versus 13 [54%] of 24 [RR = 1.4; 95% CI = 0.9–2.3]) and increased with increased frequency of swimming. The attack rate for nonswimmers was 54% (13 of 24); for infrequent swimmers (i.e., those who swam once per week or less), was 75% (six of eight); and for frequent swimmers (i.e., those who swam three or more times per week), was 80% (four of five). Of the 221 campers and staff members interviewed, 75 (41 campers and 34 staff members) reported whether they had shared a towel with another person. Towel sharing increased the risk for illness (11 of 12 who shared versus 31 of 63 who did not [RR = 1.9; 95% CI = 1.4–2.5]).

Of viral cultures (nasopharyngeal and throat swabs) obtained from 25 ill persons, 19 grew adenovirus serotype 3. Convalescent geometric mean titers (GMT) to adenovirus for persons with cases during sessions one and two (GMT 14 and GMT 28, respectively) were each significantly higher ($p<0.01$) than the GMT of persons not meeting the case definition (GMT 6). Bacterial analysis of grab samples of water obtained from the pond yielded 80 colonies per 100 cc of fecal coliforms, 200 colonies per 100 cc of enterococcus, and 9000 colonies per 100 cc of staphylococcus. A concentrated sample of pond water drawn approximately 6 feet below the surface yielded adenovirus serotype 3. Residual chlorine was not detectable.

One week after the end of the second session the pond was drained, and most counselors left. No further outbreaks were reported following the second session; however, all subsequent sessions during the summer and fall were of maximum 1-week duration.

Reported by: NS McMillan, SA Martin, MD; MD Sobsey, PhD, DA Wait, MS, Univ of North Carolina School of Public Health, Chapel Hill; Virology/Serology Section, Virology Culture Section, North Carolina Laboratory of Public Health; RA Meriwether, MD, JN MacCormack, MD,

FIGURE 1. Cases of pharyngoconjunctival fever among 88 campers* at a summer camp, by date of onset — North Carolina, 1991



*Excludes one camper for whom date of onset was unknown.

Pharyngoconjunctival Fever – Continued

State Epidemiologist, North Carolina Dept of Environment, Health, and Natural Resources. Respiratory and Enterovirus Br, National Center for Infectious Diseases; Div of Field Epidemiology, Epidemiology Program Office, CDC.

Editorial Note: The illness described in this outbreak is consistent with PCF, a syndrome caused by adenovirus (especially serotypes 3 and 7) (*1*). As in previous reports (*2,3*), three routes (person to person, fomites, and water contact) probably transmitted virus in this outbreak.

Because of the turbidity of water in soil-bottom reservoirs, chlorination is ineffective. Turbid water contains organic molecules (e.g., humic and fulvic acids from plant decay) that react with chlorine, generating trihalomethanes (THM), especially chloroform (*4,5*); THM molecules have no antiviral activity (*5*). Viruses may attach or embed in suspended particles in turbid water (*5,6*), and these virus-containing particles precipitate into the sediment on the bottom where they may remain viable in the cooler temperatures. The virus containing particles may become resuspended when the water is agitated by swimmers (*6,7*). Natural bodies of water may have inherent virucidal properties possibly related to certain species of bacteria (*6,8*). Consequently, chlorination of natural waters may actually slow elimination of virus from the water (*6,8*).

Outbreaks of both bacterial and viral diseases have been linked to swimming in streams and reservoirs. Although North Carolina monitors the microbiologic quality of streams and reservoirs, it does not regulate swimming in these waters; furthermore, there are no uniformly accepted microbiologic standards for swimming in streams and reservoirs. Regulation of swimming in these streams and reservoirs could be based on a variety of parameters such as swimmer density, water turbidity, or bacterial counts (e.g., fecal coliforms, fecal streptococcus, or staphylococcus).

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Update: Investigations of Patients Who Have Been Treated by HIV-Infected Health-Care Workers

Investigation of the patients of a Florida dentist with acquired immunodeficiency syndrome (AIDS) concluded that human immunodeficiency virus (HIV) was transmitted to five (0.5%) of approximately 1100 patients who were evaluated (*1–3*). Although

Health-Care Workers — Continued

the precise events resulting in transmission of HIV to these patients are not known, the findings of the investigation support direct dentist-to-patient transmission, rather than a patient-to-patient route. This report summarizes information from other published studies of patients who were treated by HIV-infected health-care workers (HCWs) (*4–10*), as well as from completed and ongoing unpublished investigations that have been reported to CDC.

In addition to the patients in the Florida dental practice, as of May 13, 1992, CDC was aware of HIV test results for 15,795 patients who were treated by 32 HIV-infected HCWs. The total number of patients treated by these HCWs and the number of patients who underwent invasive procedures are not known. No seropositive persons were reported among 10,270 patients who were tested from the practices of 23 of these 32 HCWs. The 23 HCWs comprised 11 dentists/dental students, six surgeons/obstetricians, and six other physicians in various nonsurgical subspecialties. For the remaining nine HCWs (five dentists and four surgeons/obstetricians), 5525 of their patients were tested, and 84 HIV-infected patients were identified.

Follow-up has been completed for 47 of the 84 seropositive patients: seven patients had established risk factors identified (e.g., male-to-male sexual contact, injecting-drug use, receipt of a blood transfusion from a retrospectively identified HIV-infected donor); five were documented to be infected before receiving care from the HIV-infected HCW; and the remaining 35 were male inmates in a state correctional facility. These 35 inmates were among a total of 962 male inmates who received treatment from two HIV-infected dentists and for whom HIV-antibody test results are known. The rate of HIV infection for inmates tested (3.6%) was less than that documented among male inmates upon entrance into the state correctional system (8.6%). Established risk factors were identified for 33 of the 35 inmates. Because both dentists have died, specimens for HIV genetic sequence analysis are not available. Further investigation of these infected inmates is not planned.

The 37 HIV-infected persons for whom investigations are in progress were patients treated by the following three HCWs:

Dentist 1. This dentist practiced in an area with a high background prevalence of HIV infection. Of 1162 patients tested thus far, 29 are HIV-infected. Established risk factors could not be identified for 17 of the 29 patients, but epidemiologic investigations determined that many may have had opportunities for exposure to HIV (e.g., multiple sex partners and/or exchange of sex for drugs or money). HIV genetic sequence analyses are in progress at CDC for the dentist and the infected patients.

Dentist 2. More than 800 patients of this dentist were tested, and five were positive for HIV antibody. Epidemiologic investigations have been completed for all five patients: three patients had established risk factors identified; a fourth patient was documented to be seronegative 18 months after the last visit to the dentist but was seropositive when retested 2 years after the seronegative test result. For the remaining patient, no risk factors were identified. This patient had one visit to the dentist for an examination. HIV genetic sequence analyses are under way at CDC for the dentist and the five infected patients.

Surgeon 1. Three of 328 patients who were tested were positive for HIV antibody. Preliminary information suggests that risk factors are likely for all three persons; investigations are in progress.

Health-Care Workers — Continued

Reported by: Local, state, and territorial health departments. HIV Infections Br, Hospital Infections Program, and Div of HIV/AIDS, National Center for Infectious Diseases; Div of Oral Health, National Center for Prevention Svcs; National Institute for Occupational Safety and Health, CDC.

Editorial Note: Data from these investigations, as well as risk estimates derived from modeling techniques (*11*), continue to indicate that the risk for HIV transmission from an infected HCW to a patient during an invasive procedure is very small. The investigation of a dental practice in Florida remains the only instance in which transmission of HIV from an infected HCW to patients has been reported (*1–3*). Although ongoing patient-notification programs have identified 84 additional HIV-infected patients who were treated by an infected HCW, follow-up thus far has not demonstrated transmission from a HCW as the source of HIV infection for any of these persons.

The finding of seropositive patients in these investigations is to be expected because an estimated one in 250 persons in the United States is infected with HIV (*12*). Higher rates of HIV infection would be expected for the patients of HCWs who practice in certain settings (e.g., correctional facilities) or in some urban centers with a high prevalence of HIV infection. When feasible, intensive follow-up of these seropositive HCWs and patients, including epidemiologic investigations and laboratory studies, has been undertaken to elucidate possible instances of transmission from HIV-infected HCWs. Because of the inherent limitations in conducting and interpreting retrospective investigations of patients of infected HCWs (*11*), additional carefully designed and implemented studies are needed to evaluate the small risk for HIV transmission during invasive procedures.

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Notice to Readers

Behavioral Risk Factor Surveillance System Conference

CDC will sponsor the Ninth Annual Behavioral Risk Factor Surveillance System (BRFSS) Conference, June 1–3, 1992, in Atlanta. The agenda will include an evaluation of BRFSS, long-term planning for the questionnaire, an alternative computer-assisted telephone interviewing system, and the use of behavioral risk factor data. There is no registration fee.

Additional information is available from the Behavioral Risk Factor Surveillance Branch, Office of Surveillance and Analysis, National Center for Chronic Disease Prevention and Health Promotion, Mailstop K-30, CDC, 1600 Clifton Road, NE, Atlanta, GA 30333; telephone (404) 488-5292.

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